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INVESTIGATION ON CHARACTERIZATION AND PYROLYSIS OF OIL SHALE FROM "UVURJARGALANT" DEPOSIT

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A detailed study on the properties and chemical composition of oil shale is important to produce petroleum products and to develop methods and technologies based on new energy resources. In Mongolia, geological reserves of oil shale, which is containing 5 to 15% of organic matter, are accounted by approximately 788 billion tons. Oil shale (OS), which is distributed in many places worldwide, is a sedimentary rock containing organic matter (OM) called kerogen and belongs to the group of sapropel solid fuels.

In this study, technical characteristics, pyrolysis and yields of soluble and insoluble (kerogen) organic matter of oil shale from Uvurjargalant deposit, were investigated and it is located 260 km from Ulaanbaatar to the west, in Central Mongolia.

As a result, the oil shale was contained low amount of moisture and volatile products, whereas the ash yield was high (71.86 %) - which implying that most of the oil shale are minerals. The total content of bitumens in the oil shale was very low (1.27 wt. %), whereas the kerogen (content of insoluble in organic solvent) content was 22.8 wt. %, suggesting that relatively high kerogen content in it compared to oil shale from other Mongolian deposits.

Table 1. Ultimate analysis of oil shale sample Uvurjargalant deposit, mas. %

№	Samples	C	H	N	S	O	H/C	O/C
1	Bitum A	76.80	11.73	0.26	1.25	9.96	1.83	0.63
2	Bitum C	67.20	9.39	0.78	1.95	20.68	1.67	0.31
3	Kerogen	66.79	9.67	1.59	1.41	26.54	1.70	0.30

The results of organic elemental analysis in Table 1 show that the content of kerogen H/C and O/C atomic ratio and IR spectroscopy. From data of IR spectroscopy, aliphatic hydrocarbons were dominant in the oil shale, which can be caused by higher sapropel source, in terms of ratio of A_{2920}/A_{1600} (2.3). This suggests that oil shale is mainly belonging to the category of kerogen I by the classification of Tissot.

The data in Table 2 also show that the maximum yield of tar and pyrolysis water is obtained at 750°C, decreasing there after slightly at higher temperature oil shale sample Uvurjargalant.

Table 2. The yields of pyrolysis products of oil shale from Uvurjargalant deposit.

Oil shale sample	Heating temperature, °C	Tar and pyrolysis water, %	Gas, %	Hard residue, %
Uvurjargalant	750	6.59	6.90	86.51

The determined some technical characteristics including specific gravity- $0.81\text{g}/\text{cm}^3$, n_D^{20} -1.456 and freezing temperature -60°C of the pyrolysis tar of investigated oil shale show that aromatic hydrocarbons are dominated in the chemical composition of the tar.

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